Note on the Recent Chinese and Mongolian Translations of Euclid's *Elements*

Jean-Claude Martzloff

Institut des Hautes Etudes Chinoises, 52 Rue du Cardinal Lemoine, F-75231 Paris Cedex 05, France

The present note gives an overview of recent research into the Chinese translations of Euclid's *Elements*. © 1997 Academic Press

La présente note contient un aperçu des recherches récentes sur les traductions chinoises des *Eléments* d'Euclide. © 1997 Academic Press

該文對歐几里得《幾何原本》新近研究工作的成果進行簡單的介紹。
© 1997 Academic Press

MSC 1991 subject classifications: 01A20, 01A25.
KEY WORDS: Euclid's *Elements,* Chinese mathematics.

The recent Chinese and Mongolian translations of Euclid's *Elements* add a new and fascinating episode to the already rich and complex history of the diffusion of one of the most important mathematical treatises of Greek antiquity. But while the history of the Chinese translations of the *Elements* goes back no more than four centuries, it is still not wholly known in all its aspects.

Due to the joint efforts of Matteo Ricci and Xu Guangqi, a famous Christian convert and high official, the first Chinese translation of Euclid appeared in 1607 under the title *Jihe yuanben* (literally, *Elementary Book on Geometry*). All subsequent Chinese editions or translations of the *Elements* were given the same title, regardless of their actual content (which was sometimes markedly different from one edition to the next). It is unknown whether the 1607 Chinese translation of the *Elements* is still extant in manuscript or in printed form.

Since later editions of the *Jihe yuanben* are not merely reproductions of the first edition, the question of the exact content of the first edition of the *Jihe yuanben* has never been solved. Nevertheless, it is well-known that the first Chinese translation of the *Elements* was based on some edition of Clavius's famous commentary on Euclid, first published in Rome in 1574 [1]. This fact puts the research of the *Jihe yuanben* on firm ground, and it enables us to compare Clavius's Latin with Ricci's Chinese.

Numerous observations on the difference between the Latin of Clavius and Classical Chinese from the end of the Ming dynasty have been published.[1] It has been noted, for example, that the text of the *Jihe yuanben* contains numerous neologisms. Chinese traditional mathematics was well developed before works from Greek antiquity were translated into Chinese, but the ancient Chinese mathematical

[1] See the recent Ph.D. dissertation [2] on the subject and [4, 112–118].

terminology could not easily be adapted to Western usage because Chinese terms often related to specific situations. For example, Euclid gives a universally valid definition of the circle, but Chinese mathematicians refer to a pond, a round field, the base of a silo, and various other context-dependent concepts.

Confronted with this situation, the translators of the *Elements* created neologisms. In particular, one of their techniques involves etymological translations; that is, literal translations of all the etymological components of a given term. The etymology of many Latin geometrical terms was thus made explicit and directly imported into Chinese. This led to terms like *jieshuo* (definition), a compound whose first and second elements, *jie* and *shuo,* respectively, mean ''limit'' and something like ''discourse'' or ''philosophical doctrine.'' While these terms make sense in a world where Aristotelian and Platonic notions are widespread, they were not understood in the context of Ming China, where Aristotle and Plato were unknown and where the notion of definition was associated with the idea of nomenclature (*mingmu*), not with the idea of limit. In the Chinese context, the notion of limit (*jie*) related to surveying, not to metaphysics.

A more fundamental difference concerns the style of writing. Whereas Classical Chinese favors the most extreme conciseness, the formal rhetoric of the *Elements* naturally involves repetitions as a result of the structure of the Euclidean discourse. Consequently, when the *Elements* became available in Chinese translation, Chinese readers were confronted with a foreign mode of expression particularly distant from their own.

These observations do not lead to any conclusion about the reception of Greek geometry in China: foreign modes of thought are not in themselves bound to remain foreign forever, and history shows that Chinese culture is made of composite elements.

Yet, from the beginning of the 17th to the 20th century, the *Jihe yuanben* was systematically judged difficult and obscure by most Chinese mathematicians, even though some Chinese scholars from various periods greatly appreciated the new geometry [5, 114–144]. This is why new translations of the Greek classic into Chinese and Manchu were commissioned by the Kangxi emperor less than a century after the publication of the first edition of the *Jihe yuanben*. These translations were made on the basis of French textbooks used in Jesuit Colleges, and they differed from the first *Jihe yuanben* since they did not respect the order of Euclid's text and contained many simplifications. While they bore the same title as that of the first translation, they were not in fact translations of the *Elements.*

This situation remained unchanged until the second half of the 19th century, when Euclid once again aroused the interest of Protestant missionaries who believed that the development of education in China at the largest possible level would serve their interests. In 1857, the first and incomplete translation of the *Elements* was brought to completion in a version composed of 17 books, as a result of the cooperation between Alexander Wylie (1815–1881) from the London Missionary Society and Li Shanlan (1811–1882), a mathematician who co-authored many other translations of Western scientific works as well. Quite surprisingly, the exact source of

this new translation is still unknown, but there is no doubt that it was based on some English textbook and not on a Greek or Latin edition of Euclid [3, 366]. Later, the whole of Euclid was made available in the form of a composite text made of the old translation of the first six books of the *Elements* and the complement in 11 books entitled *Xu Jihe yuanben* (a sequel to the *Jihe yuanben*). As far as can be surmised, this new edition does not seem to have met with much interest among Chinese mathematicians.

As Mo De and Jiang Zhenhua explain in the preceding article, the *Elements* were translated once again into Chinese between 1980 and 1990. However, the language of this new translation is modern Chinese, a language quite different from Classical Chinese. The difference appears in the terminology and in the syntax; the difference between Classical and modern Chinese can be compared with that between Latin and English (or other European languages). Euclid (or rather Heath's Euclid) has thus been made available to a large number of Chinese readers, and historical research on Euclid has become the main concern of Chinese historians of mathematics interested in Greek geometry. This new interest has already resulted in a discovery, by Liu Dun, of a hitherto unknown manuscript of a translation of a manual of geometry from the beginning of the 18th century, preserved in Taiwan [5, 76–80].

REFERENCES

1. Clavius, *Euclidis Elementorum libri XV. Accessit XVI. de solidorum regularium cuiuslibet intra quodlibet comparatione,* Rome: Apud V. Accoltum, 1574.
2. Peter M. Engelfriet, *Euclid in China: A Survey of the Historical Background of the First Chinese Translation of Euclid's* Elements (Jihe yuanben; *Beijing, 1607*), *an Analysis of the Translation, and a Study of Its Influence up to 1723,* Ph.D. dissertation, Rijksuniversiteit Leiden, 1996.
3. Horng Wann-Sheng, *Li Shanlan: The Impact of Western Mathematics in China during the Late 19th Century,* Ph.D. dissertation, City University of New York, 1991.
4. Jean-Claude Martzloff, *A History of Chinese Mathematics,* Heidelberg: Springer, 1996.
5. Mo De ed., *Oujilide Jihe yuanben yanjiu lunwen ji* (Collected research papers into Euclid's *Elements*), Haila'er: Nei Menggu Wenhua Chubanshe, 1995.

ARTICLE NO. HM962148